

## CLAIMS:

1. A method for the production of an olefin co-polymer for producing an olefin co-polymer wherein the monomers are evenly distributed throughout the length of each polymer molecule, which method comprises co-polymerising two or more olefin monomers in the presence of a metallocene catalyst, wherein the metallocene catalyst comprises a metallocene having the following formula:



wherein Cp comprises a cyclopentadienyl ring; Flu comprises a fluorenyl ring; R'' comprises a structural bridge imparting stereorigidity to the component; each R is the same or different and is an organic group; m is an integer of from 1-4; each R' is the same or different and is an organic group; n is an integer of from 0-8; M is a metal atom from group IVB of the Periodic Table or is vanadium; and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen.

2. A method according to claim 1, wherein at least one group R is positioned on the cyclopentadienyl ring such that it is distal to the bridge R''.

3. A method according to claim 1 or claim 2, wherein at least one group R comprises a bulky group of the formula  $ZR^*_3$  in which Z is an atom from group IVA of the Periodic Table and each R\* is the same or different and is chosen from a hydrogen or a hydrocarbyl group having from 1-20 carbon atoms.

4. A method according to any preceding claim, wherein at least one further group R comprises a group of the formula  $YR^{\#}_3$  in which Y is an atom from group IVA of the Periodic Table, and each R# is the same or different and is chosen from a hydrogen or a hydrocarbyl group having from 1-7 carbon atoms.

5. A method according to any of claims 2-4, wherein the cyclopentadienyl ring comprises a substituent  $ZR^*_3$  distal to the bridge  $R''$  and a substituent  $YR^{\#}_3$  proximal to the bridge and non-vicinal to  $ZR^*_3$ .
6. A method according to any preceding claim, wherein the fluorine ring comprises a substituent at the 3-position and/or at the 6-position, or at the 2-position and/or at the 7-position.
7. A method according to any one of claims 2 to 6, wherein  $ZR^*_3$  is selected from  $C(CH_3)_3$ ,  $C(CH_3)_2Ph$ ,  $CPh_3$ , and  $Si(CH_3)_3$ .
8. A method according to any one of claims 3 to 7, wherein  $YR^{\#}_3$  comprises  $CH_3$ .
9. A method according to any one of the preceding claims, wherein  $R''$  comprises a silyl radical or a hydrocarbyl radical having at least one carbon atom to form the bridge.
10. A method according to any one of the preceding claims, wherein  $M$  is Ti, Zr, or Hf.
11. A method according to any one of the preceding claims, wherein  $Q$  is Cl or methyl.
12. A method according to any one of the preceding claims, wherein ethylene is employed as an olefin monomer.
13. A method according to any one of the preceding claims, wherein propylene is employed as an olefin monomer.

14. Use of a metallocene catalyst for producing an olefin co-polymer wherein the monomers are evenly distributed throughout the length of each polymer molecule and wherein the metallocene catalyst comprises a metallocene having the following formula:



wherein Cp comprises a cyclopentadienyl ring; Flu comprises a fluorenyl ring; R'' comprises a structural bridge imparting stereorigidity to the component; each R is the same or different and is an organic group; m is an integer of from 1-4; each R' is the same or different and is an organic group; n is an integer of from 0-8; M is a metal atom from group IVB of the Periodic Table or is vanadium; and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen.

15. Use according to claim 14, wherein the metallocene compound is a compound as defined in any of claims 2 to 11.

16. Use according to claim 14 or claim 15 for forming an ethylene/propylene co-polymer wherein the monomers are evenly distributed throughout the length of each polymer molecule and having a melting temperature of about 105 °C.

17. An olefin co-polymer wherein the monomers are evenly distributed throughout the length of each polymer molecule, obtainable according to a method as defined in any of claims 1 to 13.